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UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No. 80398.P323Total Pages 2First Named Inventor or Application Identifier Brant L. Candelore, et al.Express Mail Label No. EL234215292US

ADDRESS TO: Assistant Commissioner for Patents
 Box Patent Application
 Washington, D. C. 20231

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

1. X Fee Transmittal Form
(Submit an original, and a duplicate for fee processing)
2. X Specification (Total Pages 21) (+ coversheet)
 (preferred arrangement set forth below)
 - Descriptive Title of the Invention
 - Cross References to Related Applications
 - Statement Regarding Fed sponsored R & D
 - Reference to Microfiche Appendix
 - Background of the Invention
 - Brief Summary of the Invention
 - Brief Description of the Drawings (if filed)
 - Detailed Description
 - Claims
 - Abstract of the Disclosure
3. X Drawings(s) (35 USC 113) (Total Sheets 4)
4. X Oath or Declaration (Total Pages 5) (unexecuted)
 - a. Newly Executed (Original or Copy)
 - b. Copy from a Prior Application (37 CFR 1.63(d))
 (for Continuation/Divisional with Box 17 completed) (**Note Box 5 below**)
 - i. DELETIONS OF INVENTOR(S) Signed statement attached deleting inventor(s) named in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b).
5. Incorporation By Reference (useable if Box 4b is checked)
 The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied under Box 4b, is considered as being part of the disclosure of the accompanying application and is hereby incorporated by reference therein.
6. Microfiche Computer Program (Appendix)

10/10/00
 1c872 U.S. PTO

JC914 U.S. PTO
 09/688375

10/10/00

09588375 101000

7. ☐ Nucleotide and/or Amino Acid Sequence Submission
(if applicable, all necessary)
a. ☐ Computer Readable Copy
b. ☐ Paper Copy (identical to computer copy)
c. ☐ Statement verifying identity of above copies

ACCOMPANYING APPLICATION PARTS

8. ☐ Assignment Papers (cover sheet & documents(s))
9. ☐ a. 37 CFR 3.73(b) Statement (where there is an assignee)
☐ b. Power of Attorney
10. ☐ English Translation Document (if applicable)
11. ☒ a. Information Disclosure Statement (IDS)/PTO-1449
☒ b. Copies of IDS Citations
12. ☐ Preliminary Amendment
13. ☒ Return Receipt Postcard (MPEP 503) (Should be specifically itemized)
14. ☐ a. Small Entity Statement(s)
☐ b. Statement filed in prior application, Status still proper and desired
15. ☐ Certified Copy of Priority Document(s) (if foreign priority is claimed)
16. ☐ Other: _____

17. **If a CONTINUING APPLICATION**, check appropriate box and supply the requisite information:
☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP)
of prior application No: _____

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☒ Correspondence Address Below

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FEE TRANSMITTAL FOR FY 2001**TOTAL AMOUNT OF PAYMENT (\$)** \$ 1262.00**Complete if Known:**

Application No. *****
 Filing Date 10/10/2000
 First Named Inventor Brant L. Candelore, et al.
 Group Art Unit *****
 Examiner Name *****
 Attorney Docket No. 80398.P323

METHOD OF PAYMENT (check one)

1. ☒ [X] The Commissioner is hereby authorized to charge indicated fees and credit any over payments to:

Deposit Account Number 02-2666
 Deposit Account Name _____

☐ [] Charge Any Additional Fee Required Under 37 CFR 1.16 and 1.17

2. ☒ X Payment Enclosed:

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 _____ Money Order
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FEE CALCULATION**1. BASIC FILING FEE**

Large Entity		Small Entity		Fee Description	Fee Paid
Code	Fee (\$)	Code	Fee (\$)		
101	710	201	355	Utility application filing fee	<u>710.00</u>
106	320	206	160	Design application filing fee	_____
107	490	207	245	Plant filing fee	_____
108	710	208	355	Reissue filing fee	_____
114	150	214	75	Provisional application filing fee	_____
SUBTOTAL (1)					\$ 710.00

2. EXTRA CLAIM FEES

		Extra Claims	Fee from below	Fee Paid
Total Claims	<u>24</u>	- 20** = <u>4</u>	X <u>18.00</u>	= <u>72.00</u>
Independent Claims	<u>9</u>	- 3** = <u>6</u>	X <u>80.00</u>	= <u>480.00</u>
Multiple Dependent				= _____

**Or number previously paid, if greater; For Reissues, see below.

Large Entity		Small Entity		Fee Description
Code	Fee (\$)	Code	Fee (\$)	
103	18	203	9	Claims in excess of 20
102	80	202	40	Independent claims in excess of 3
104	270	204	135	Multiple dependent claim, if not paid
109	80	209	40	**Reissue independent claims over original patent
110	18	210	9	**Reissue claims in excess of 20 and over original patent

SUBTOTAL (2) **\$ 552.00**

FEE CALCULATION (continued)**3. ADDITIONAL FEES**

Large Entity Small Entity

Fee Code	Fee (\$)	Fee Code	Fee (\$)	Fee Description	Fee Paid
105	130	205	65	Surcharge - late filing fee or oath	_____
127	50	227	25	Surcharge - late provisional filing fee or cover sheet	_____
139	130	139	130	Non-English specification	_____
147	2,520	147	2,520	For filing a request for reexamination	_____
112	920*	112	920*	Requesting publication of SIR prior to Examiner action	_____
113	1,840*	113	1,840*	Requesting publication of SIR after Examiner action	_____
115	110	215	55	Extension for response within first month	_____
116	390	216	195	Extension for response within second month	_____
117	890	217	445	Extension for response within third month	_____
118	1,390	218	695	Extension for response within fourth month	_____
128	1,890	228	945	Extension for response within fifth month	_____
119	310	219	155	Notice of Appeal	_____
120	310	220	155	Filing a brief in support of an appeal	_____
121	270	221	135	Request for oral hearing	_____
138	1,510	138	1,510	Petition to institute a public use proceeding	_____
140	110	240	55	Petition to revive unavoidably abandoned application	_____
141	1,240	241	620	Petition to revive unintentionally abandoned application	_____
142	1,240	242	620	Utility issue fee (or reissue)	_____
143	440	243	220	Design issue fee	_____
144	600	244	300	Plant issue fee	_____
122	130	122	130	Petitions to the Commissioner	_____
123	50	123	50	Petitions related to provisional applications	_____
126	240	126	240	Submission of Information Disclosure Stmt	_____
581	40	581	40	Recording each patent assignment per property (times number of properties)	_____
146	710	246	355	For filing a submission after final rejection (see 37 CFR 1.129(a))	_____
149	710	249	355	For each additional invention to be examined (see 37 CFR 1.129(b))	_____
179	710	279	355	Request for Continued Examination (RCE)	_____
169	900	169	900	Request for expedited examination of a design application	_____
Other fee (specify)				_____	_____
Other fee (specify)				_____	_____
SUBTOTAL (3)					\$ _____

*Reduced by Basic Filing Fee Paid

SUBMITTED BY:

Signature: Maria McCormack Bohring Date: October 10, 2000

Reg. Number: 31,639 **Telephone Number:** 408-720-8300

"Express Mail" mailing label number: EL234215292US

Date of Deposit: October 10, 2000

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United States Patent Application
For

METHOD FOR STANDARDIZING THE USE OF ISO 7816 SMART CARDS IN
CONDITIONAL ACCESS SYSTEMS

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METHOD FOR STANDARDIZING THE USE OF ISO 7816 SMART CARDS IN CONDITIONAL ACCESS SYSTEMS

CROSS-REFERENCE TO RELATED APPLICATION

5 This application claims the benefit of the filing date of the Provisional U.S. Patent Application entitled "METHOD FOR STANDARDIZING THE USE OF ISO 7816 SMART CARDS IN RECEIVERS PERFORMING CONDITIONAL ACCESS", application number 60/197,147, filed April 14, 2000.

10 **FIELD OF THE INVENTION**

 The present invention pertains to the field of conditional access mechanisms. More particularly, the present invention relates to standardizing the use of ISO 7816 smart cards in conditional access systems.

15 **BACKGROUND OF THE INVENTION**

 In applications, appliances, computer systems, or other systems where data and/or signals are scrambled, encrypted, or protected, there is often a control mechanism to allow the descrambling, decryption, or decoding of such data and/or signals. This control mechanism is often referred to as a conditional access (CA) system or module.

20 The CA system may consist of several modules that perform functions. Some of the functions may be performed on a card which may be inserted into a system or slot. One common form factor is that of a smart card, another is Personal Computer Memory Card International Association (PCMCIA). Smart cards have several standards, one is International Organization for Standardization (ISO) 7816. Reference will be made to
25 this specification as ISO 7816. PCMCIA cards have several standards, one is Type 2.

Reference to a smart card is to be understood to refer to the ISO 7816 standard unless stated otherwise. Reference to a PCMCIA card is to be understood to refer to the PCMCIA Type 2 standard unless stated otherwise.

There are several standards for conditional access systems. In the U.S., one such standard is the National Renewable Security Standard (NRSS). The NRSS has defined two types of CA modules, a NRSS part A module (NRSS-A) with a smart card form factor, and NRSS Part B (NRSS-B) with a PCMCIA form factor. In the U.S. some other standards are OpenCable™ Host Point Of Deployment Interface Specification (POD), and Conditional Access System for Terrestrial Broadcast (ATSC-A70). In Europe, Digital Video Broadcasting (DVB) organization has defined a CA module similar to NRSS Part B called “Common Interface” (CI).

One of the challenges facing manufacturers building devices that have conditional access capability is that they want a standardized method for communicating to CA modules. NRSS Part A, which uses the smart card form factor, has technical implementation issues. NRSS part B modules, which are PCMCIA form factor, are expensive, and have some technical issues as well. Devices that may accept a CA module include, but are not limited to, televisions (TVs), video cassette recorders (VCRs), personal video recorders (PVRs), home jukebox players, set top boxes (STB) for terrestrial broadcast, cable, or satellite, etc. Manufacturers want the CA interface standardized so that the devices can be built in a generic way. The NRSS-A CA card is not a typical ISO 7816 smart card, and NRSS-A cards are not readily available.

A device (set top box, TV, VCR, etc.), which has both a CA interface for an ISO 7816 smart card, and a POD module typically has two separate interface protocols. Different CA protocols for different types of CA modules adds to the complexity of the

device.

	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	2101	2102	2103	2104	2105	2106	2107	2108	2109	2110	2111	2112	2113	2114	2115	2116	2117	2118	2119	2120	2121	2122	2123	2124	2125	2126	2127	2128	2129	2130	2131	2132	2133	2134	2135	2136	2137	2138	2139	2140	2141	2142	2143	2144	2145	2146	2147	2148	2149	2150	2151	2152	2153	2154	2155	2156	2157	2158	2159	2160	2161	2162	2163	2164	2165	2166	2167	2168	2169	2170	2171	2172	2173	2174	2175	2176	2177	2178	2179	2180	2181	2182	2183	2184	2185	2186	2187	2188	2189	2190	2191	2192	2193	2194	2195	2196	2197	2198	2199	2200	2201	2202	2203	2204	2205	2206	2207	2208	2209	2210	2211	2212	2213	2214	2215	2216	2217	2218	2219	2220	2221	2222	2223	2224	2225	2226	2227	2228	2229	2230	2231	2232	2233	2234	2235	2236	2237	2238	2239	2240	2241	2242	2243	2244	2245	2246	2247	2248	2249	2250	2251	2252	2253	2254	2255	2256	2257	2258	2259	2260	2261	2262	2263	2264	2265	2266	2267	2268	2269	2270	2271	2272	2273	2274	2275	2276	2277	2278	2279	2280	2281	2282	2283	2284	2285	2286	2287	2288	2289	2290	2291	2292	2293	2294	2295	2296	2297	2298	2299	2300	2301	2302	2303	2304	2305	2306	2307	2308	2309	2310	2311	2312	2313	2314	2315	2316	2317	2318	2319	2320	2321	2322	2323	2324	2325	2326	2327	2328	2329	2330	2331	2332	2333	2334	2335	2336	2337	2338	2339	2340	2341	2342	2343	2344	2345	2346	2347	2348	2349	2350	2351	2352	2353	2354	2355	2356	2357	2358	2359	2360	2361	2362	2363	2364	2365	2366	2367	2368	2369	2370	2371	2372	2373	2374	2375	2376	2377	2378	2379	2380	2381	2382	2383	2384	2385	2386	2387	2388	2389	2390	2391	2392	2393	2394	2395	2396	2397	2398	2399	2400	2401	2402	2403	2404	2405	2406	2407	2408	2409	2410	2411	2412	2413	2414	2415	2416	2417	2418	2419	2420	2421	2422	2423	2424	2425	2426	2427	2428	2429	2
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SUMMARY OF THE INVENTION

A conditional access system and method are disclosed allowing the use of a standard smart card. A computing resource configured to run the conditional access protocol has a smart card interface and a software wrapper configured to run on the

5 computing resource coupling the smart card interface to the conditional access protocol.

80398.P323

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention is illustrated by way of example and not limited by the figures of the accompanying drawings in which like references indicate similar elements and in which:

- 5 Figure 1 is an illustration of a prior art conditional access system;
- Figure 2 illustrates a block diagram of one embodiment of the present invention;
- Figure 3 illustrates another embodiment of the present invention;
- Figure 4 illustrates signal flow in another embodiment of the present invention;
- Figure 5 illustrates resources in one possible embodiment of a conditional access
- 10 system; and
- Figure 6 illustrates information flow in another embodiment of a conditional access system.

DETAILED DESCRIPTION

A method and apparatus for using a standard smart card in a conditional access system is described. References will be made to communications, links, pathways, etc., and it is to be understood that what these terms refer to is information being transferred.

5 This information being transferred may be in the form of a signal, a series of signals, data, or streams of data. The actual mechanism for the transfer of the information is not critical to the description or understanding of the present invention and may take the form of wired, wireless, busses, optical, or other transmission medium.

Computing resources may be referred to as well as executing programs,
10 coupling, and routing data and/or signals in software. What is to be understood is that a computing resource, such as a microprocessor, is executing a series of instructions, which are causing these operations to occur. For example, the routing of signals and/or data may consist of presenting computing results to a memory location, a stack, an electrical bus structure, etc.

15 Likewise, reference is made to application programming interfaces (API). It is to be understood that an API is one of several methods to gain access to computing resources. The API may consist of software, hardware, or a combination of hardware and software. For example, a software API may consist of a call routine. An API involving hardware may consist of an interrupt request.

20 Figure 1 is an illustration of a prior art conditional access system. In Figure 1 the conditional access (CA) system 100 has three major blocks, a host 102, a CA module 110, and a smart card 130. Coming from the host 102 is a data stream 106, which may be scrambled. The data stream 106 enters a descrambler 112 in the CA module 110 and produces a descrambled output 114. The descrambled output 114 may

then enter an optional copy protection 116 block and be sent as a copy protected stream 108 to the host 102 where it is received by a copy protection block 104 in the host 102. The copy protection 116 in the CA module 110 and the copy protection 104 in the host 102 are optional blocks. For example, at this time the DVB organization has not specified a copy protection method. Smart card 130 communicates with the CA module 110 via link 126 with a smart card interface 124. The smart card interface 124 communicates to the central processing unit (CPU) 120 via communication link 122. The CPU 120 interfaces with the descrambler 112 via pathway 118.

An example of an operational sequence would be the host 102 sending a scrambled data stream 106 to the descrambler 112. The descrambler 112 may then communicate via 112 to the CPU 120 a request for a CA code word required for the descrambler 112 to descramble the scrambled data stream 106. The CPU 120 may then communicate via link 122 the request to the smart card interface 124, which in turn communicates via link 126 with the smart card 130. The smart card 130 may then communicate back to the smart card interface 124 via link 126 the requested information. This information is then communicated via link 122 to the CPU 120 and then through pathway 118 to the descrambler 112, which then uses the information to descramble the signal. This descrambled signal 114 then may optionally pass through copy protection 116. The signal is then communicated from the CA module 110 through link 108 to the host 102 where it may optionally pass through a copy protection 104.

Figure 2 illustrates a block diagram of one embodiment of the present invention. In this embodiment, the CA system 200 has two major blocks, a host 202, and a smart card 230. The smart card 230 communicates via link 226 with the smart card interface

224. The smart card interface 224 communicates via link 222 with the CPU 220. The CPU 220 communicates via link 218 with the descrambler 212. The descrambler 212 may receive a scrambled data stream 206 and may descramble it providing a descrambled data stream 214.

As can be seen from the prior art as illustrated in Figure 1 and one embodiment of the present invention as shown in Figure 2, the functionality of the CA module 110 in Figure 1 is being substantially performed by the host 202 in Figure 2. Thus, for example, the descrambler function in the prior art, which was performed in a CA module 110, may in the present invention be performed substantially by the host 202.

Thus, the host may be required to perform replacement functions for some of the functionality that the CA module 110 in the prior art performed.

Figure 3 illustrates another embodiment of the present invention. An existing conditional access protocol 310 interfaces with a software wrapper 320 which interfaces to a smart card interface 330. The CA protocol 310, may be for example, an industry standard protocol conforming to a spec, such as the NRSS-B. The software wrapper 320 presents to the CA protocol 310 the proper signals and/or data such that the NRSS-B protocol is met. That is, the CA protocol 310 does not have to be modified to work with a smart card because the software wrapper 320 performs those functions that in combination with the smart card fully meet the CA protocol 310. The actual interface of the software wrapper 320 to the CA protocol 310 may, for example, be through an application programming interface (API) of the CA protocol 310. Functions that the software wrapper 320 may need to perform in order to allow the smart card interface 330 to operate and/or interface to the CA protocol 310, may for example include, but are not limited to such functions as demultiplexing of entitlement management mode

(EMM) messages, entitlement control messages (ECM), service information (SI), etc. Additionally the software wrapper 320 may need to load descrambling keys into a descrambler.

It is to be understood that the specific implementation of the smart card interface 330, the software wrapper 320, and the CA protocol 310, may all be in software, hardware, or a combination of software and hardware. For example, the CA protocol 310, and software wrapper 320 may be software programs executing on a host's resources such as a CPU, memory, non-volatile storage, etc. The smart card interface 330, may for example, be implemented in hardware and may consist of something as simple as a receptacle for a smart card to plug into. The smart card may be more complicated and consist of, for example, a microprocessor based controller interfaced to a wireless transmitter and receiver for communication with a smart card.

Figure 4 illustrates signal flow in another embodiment. Figure 4 illustrates transform functions 414 being used to interface a smart card interface 410 and a conditional access (CA) applications programming interface (API) 418. CA API 418 may issue information 420 in the form of signals and/or data that requires a response for the CA protocol to operate. The information 420 is received by the transform functions 414, which depending upon the response required may route the information to different destinations. In one instance the information 420 received by the transform functions 414 may be routed unaltered as information 422 to the smart card interface 410.

Alternatively, information 420 received by the transform functions 414 may be routed after some transformation as information 422 to the smart card interface 410. In another instance the information 420 received by the transform functions 414 may be locally transformed to meet the CA API and then sent as information 416 to the CA API 418.

In yet a third instance, there may be a combination of transformations being performed by the transform function 414, with some information 422 being sent the smart card interface 410, and other information being sent after local transformation as information 416 to the CA API 418.

- 5 Information 412 received from the smart card interface 410 by the transform functions 414 may likewise have several destinations. Information 412 received from the smart card interface 410 by the transform functions 414 may be passed straight through from transform functions 414 as information 416 to the CA API 418.
- 10 Information 412 received from the smart card interface 410 by the transform functions 414 may be transformed locally by the transform functions 414 and used locally in combination with other transform results and then may be sent as information 416 to the CA API 418, or it may be transformed by transform functions 414 and then sent as information 416 to the CA API 418, or it may be sent unaltered as information 416 to the CA API 418, or it may be used locally by the transform functions 414 and not sent
- 15 on, or a combination of these operations is possible.

- The transformation of the information by transform functions 414 may be via software, hardware, or a combination of hardware and software. For example, a simple hardware transformation may be inverting the polarity of a signal received from the CA API 418. A simple software transformation may be reformatting a smart card status
- 20 signal received from the smart card interface 410 into a format compatible with the CA API 418. Transform functions 414 therefore is to be understood to provide those transformation of information, signals, and/or data such that the transform functions 414 receives information 420 from and sends information 416 to the CA API 418 such that the CA API 418 needs no modifications to operate. Likewise, transform functions 414

is to be understood to provide those transformation of information, signals, and/or data such that the transform functions 414 sends information 422 to and receives information 412 from the smart card interface 410 such that the smart card interface 410 needs no modifications to operate.

5 Figure 5 illustrates resources in one possible embodiment of a conditional access system. In a CA system 500, computing resources 502 may consist of, but are not limited to, a CPU, memory, hardware, non-volatile storage, interfaces, etc. Operating system (OS) 504 may consist of, but is not limited to, a standard OS such as Unix, a custom OS, or a combination. Conditional access 506 may consist of, but is not limited to, a standard CA protocol such as NRSS, POD, ATSC-A70, CI, etc. The CA 506 may have a driver API 507 for interfacing. Such an interface, for example, may be a PCMCIA. Wrapper 508 may consist of hardware, software, or a combination of these. Proprietary interface (I/F) 509 may consist of, but is not limited to, legacy code, legacy support, special features, API's, etc. Smart card interface 510 may consist of, but is not limited to, hardware and/or software providing support and interfacing to an ISO 7816 smart card.

10 In the example of CA system 500 as shown in Figure 5, resources such as OS 504, CA 506, driver API 507, wrapper 508, proprietary I/F 509, and smart card interface 510 that are in contact with each other have access to those resources. For example, the OS 504, CA 506, driver API 507, wrapper 508, proprietary I/F 509, and smart card interface 510 all have access to computing resources 502. Smart card interface 510 has access to computing resources 502, proprietary I/F 509, and wrapper 508.

15 In one embodiment of Figure 5, for example, computing resources 502 may consist of a host computer in an OpenCable™ compliant set top box or television. The

OS 504 may be a version of Linux. CA 506 may be OpenCable™ POD, and driver API 507 may be the PCMCIA API interfacing to OpenCable™ POD. Wrapper 508 may be software, proprietary I/F 509 may be legacy support for a smart card, and smart card interface 510 may be an interface to an ISO 7816 smart card.

5 Proprietary I/F 509 may, but is not limited to, providing support for a smart card interface 510 that is non-standard, or providing functional capabilities. That is, recall that some functions previously performed by a CA module separate from a host (see Figure 1, CA module 110, and host 102) may now be performed by the host (see Figure 2, host 202). Thus, the wrapper 508 by interfacing with the proprietary I/F 509 and the
10 CA 506, may provide support for functions and/or non-standard interfaces to smart cards. For example, a manufacturer may have developed a system with a proprietary interface to a smart card, yet now wants to use a standard CA protocol. In such a situation, the best approach may be to use some or all of the originally designed functionality rather than totally redesigning the system. Wrapper 508 may provide the
15 interfacing needed between the proprietary I/F 509 and the CA 506. That is, the manufacturer by using the present invention may couple their smart card proprietary interface to an industry standard conditional access protocol.

Figure 6 illustrates information flow in another embodiment of a conditional access system. Figure 6 shows a CA system 600 indicating information, data, and/or
20 signal flows denoted by arrows. Each block, by necessity for clarity, is a high level representation of the function and may include hardware and/or software. For example, hardware (HW) block 602 refers to computing resources such as a CPU, memory, storage, etc. HW 602 is capable of communicating directly with a conditional access (CA) 604 block, a software interface (SW I/F) 606 block, and a wrapper 608 via

communication link 612. HW 602 is also capable of communication with smart card interface (SC I/F) 610 block via link 616. CA 604, SW I/F 606, and wrapper 608 can communicate with SC I/F via link 614. Additionally, CA 604, SW I/F 606, and wrapper 608 are connected to each other and may communicate with each other as indicated by the arrows showing such connection to each other.

While the above embodiment examples illustrate some possible configurations, it is to be understood that one practiced in the art may implement the functions in a variety of ways. For example, the transformation functions that enable a smart card to interface to an existing CA protocol may be implemented by dedicated proprietary software and/or hardware, or may be standardized as an API. These API's may be viewed as providing replacement functions that are necessary to interface between a standard smart card, such as an ISO 7816 smart card, and a standard CA protocol API, such as the NRSS-B PCMCIA API. The transformation functions may be also be implemented within an integrated circuit (IC), a processor or series of processors executing code, a dedicated controller or controllers, etc. Different CA protocols may be established in the future, which with the proper interfacing will allow the use of a smart card.

Likewise, it is to be understood that references to specifications or standards, such as NRSS-B, ISO 7816, etc., does not imply that the present invention requires a full and complete implementation of the entirety of a referenced specification or standard to be operable. For example, an ISO 7816 smart card interface is a smart card interface that complies substantially with ISO 7816 such that there is a minimum operable state of functionality allowing operation for the intended purpose or purposes.

Thus, a method and apparatus for allowing the use of a standard smart card in a conditional access system have been described. Although the present invention has been described with reference to specific exemplary embodiments, it will be evident that various modifications and changes may be made to these embodiments without

5 departing from the broader spirit and scope of the invention as set forth in the claims.

Accordingly, the specification and drawings are to be regarded in an illustrative rather than a restrictive sense.

80398.P323

CLAIMS

What is claimed is:

- 1 1. A conditional access (CA) system comprising:
 - 2 a computing resource configured to run a CA protocol;
 - 3 a smart card interface; and
 - 4 a software wrapper configured to couple the smart card interface to the CA
 - 5 protocol.
- 1 2. The CA system of claim 1, wherein the smart card interface complies substantially
 - 2 with International Organization for Standardization standard 7816 (ISO 7816).
- 1 3. The CA system of claim 1, wherein the CA protocol is selected from the group
 - 2 consisting of National Renewable Security Standard Part B (NRSS-B), OpenCable™
 - 3 Host Point Of Deployment Interface Specification (POD), Common Interface
 - 4 Specification for Conditional Access and other Digital Video Broadcasting Decoder
 - 5 Applications (CI), and Conditional Access System for Terrestrial Broadcast (ATSC-
 - 6 A70).
- 1 4. The CA system of claim 1, wherein the software wrapper is configured to run on the
 - 2 computing resource.
- 1 5. A smart card interface comprising:

2 a smart card receptacle for coupling to a smart card to communicate smart card
3 signals;
4 a Personal Computer Memory Card International Association (PCMCIA)
5 Application Programming Interface (API); and
6 wrapper software interfacing the smart card signals and the PCMCIA API.

1 6. The smart card interface of claim 5, where the PCMCIA API is a CA API.

1 7. The smart card interface of claim 6, where the smart card signals are received from
2 an ISO 7816 smart card.

1 8. A conditional access (CA) system comprising:

2 means for executing a CA program;
3 means for coupling to a smart card interface; and
4 means for executing interfacing software.

1 9. The system of claim 8 wherein interfacing software comprises:

2 means for coupling to smart card signals;
3 means for coupling to the CA program API; and
4 means for routing the smart card signals to and from the CA program.

1 10. A conditional access (CA) method comprising:

2 routing signals received from a smart card interface to interface software;
3 coupling an output of the interface software to an API of a CA protocol;

4 coupling an output of the CA protocol to an input of the interface software; and
5 routing output signals of the interface software to the smart card interface.

1 11. A conditional access (CA) method comprising:

2 routing smart card signals to interface software executing on a first computing
3 resource;

4 coupling the inputs and outputs of the interface software to a CA protocol
5 executing on a second computing resource; and

6 executing a software wrapper program on a third computing resource coupling a
7 smart card interface to the CA protocol.

1 12. The method of claim 11 wherein the first computing resource, the second
2 computing resource, and the third computing resource are a common computing
3 resource.

1 13. A method for interfacing to a conditional access protocol, the method comprising:

2 receiving signals and data from a smart card interface;

3 transforming the received signals and data from the smart card interface into a
4 format compatible with the conditional access protocol;

5 presenting the transformed received signals and data from the smart card

6 interface to a conditional access system implementing the conditional access protocol;

7 receiving from the conditional access system signals and data;

8 transforming the received signals and data from the conditional access system

9 into a format compatible with the smart card interface; and

10 presenting the transformed received signals and data from the conditional access
11 system to the smart card interface.

1 14. The method of claim 13 wherein the smart card interface is an ISO 7816 smart card
2 interface.

1 15. The method of claim 13 wherein the conditional access protocol is a standard
2 conditional access protocol.

1 16. The method of claim 15 wherein the standard conditional access protocol is
2 selected from the group consisting of National Renewable Security Standard Part B
3 (NRSS-B), OpenCable™ Host Point Of Deployment Interface Specification (POD),
4 Common Interface Specification for Conditional Access and other Digital Video
5 Broadcasting Decoder Applications (CI), and Conditional Access System for Terrestrial
6 Broadcast (ATSC-A70).

1 17. A conditional access (CA) system comprising:
2 a first computing resource configured to execute a NRSS-B protocol;
3 an ISO 7816 smart card interface; and
4 a software wrapper configured to execute on a second computing resource to
5 couple the ISO 7816 smart card interface to the NRSS-B protocol.

1 18. The system of claim 17 wherein the first computing resource and the second
2 computing resource are a same computing resource.

19. A machine-readable program storage medium tangibly embodying information
 allowing a machine to perform a method for conditional access, the method comprising:
 receiving signals and data from a smart card interface;
 transforming the received signals and data from the smart card interface into a
 format compatible with the conditional access protocol;
 presenting the transformed received signals and data from the smart card
 interface to a conditional access system implementing the conditional access protocol;
 receiving from the conditional access system signals and data;
 transforming the received signals and data from the conditional access system
 into a format compatible with the smart card interface; and
 presenting the transformed received signals and data from the conditional access
 system to the smart card interface.

20. A conditional access (CA) system comprising:
 a first computing resource configured to execute a first CA protocol;
 a second computing resource configured to execute a second CA protocol; and
 a third computing resource configured to couple the first computing resource to
 the second computing resource.

21. The conditional access (CA) system of claim 20 wherein the second CA protocol is
 not an industry standard CA protocol.

1 22. The conditional access (CA) system of claim 21 wherein the second CA protocol
2 interfaces to a smart card.

1 23. The conditional access (CA) system of claim 20 wherein the third computing
2 resource configured to couple the first computing resource to the second computing
3 resource is further configured such that the second CA protocol is substantially
4 compliant with the first CA protocol.

1 24. The conditional access (CA) system of claim 20 wherein the first computing
2 resource, the second computing resource, and the third computing resource execute code
3 on a single processor.

[illegible]

5

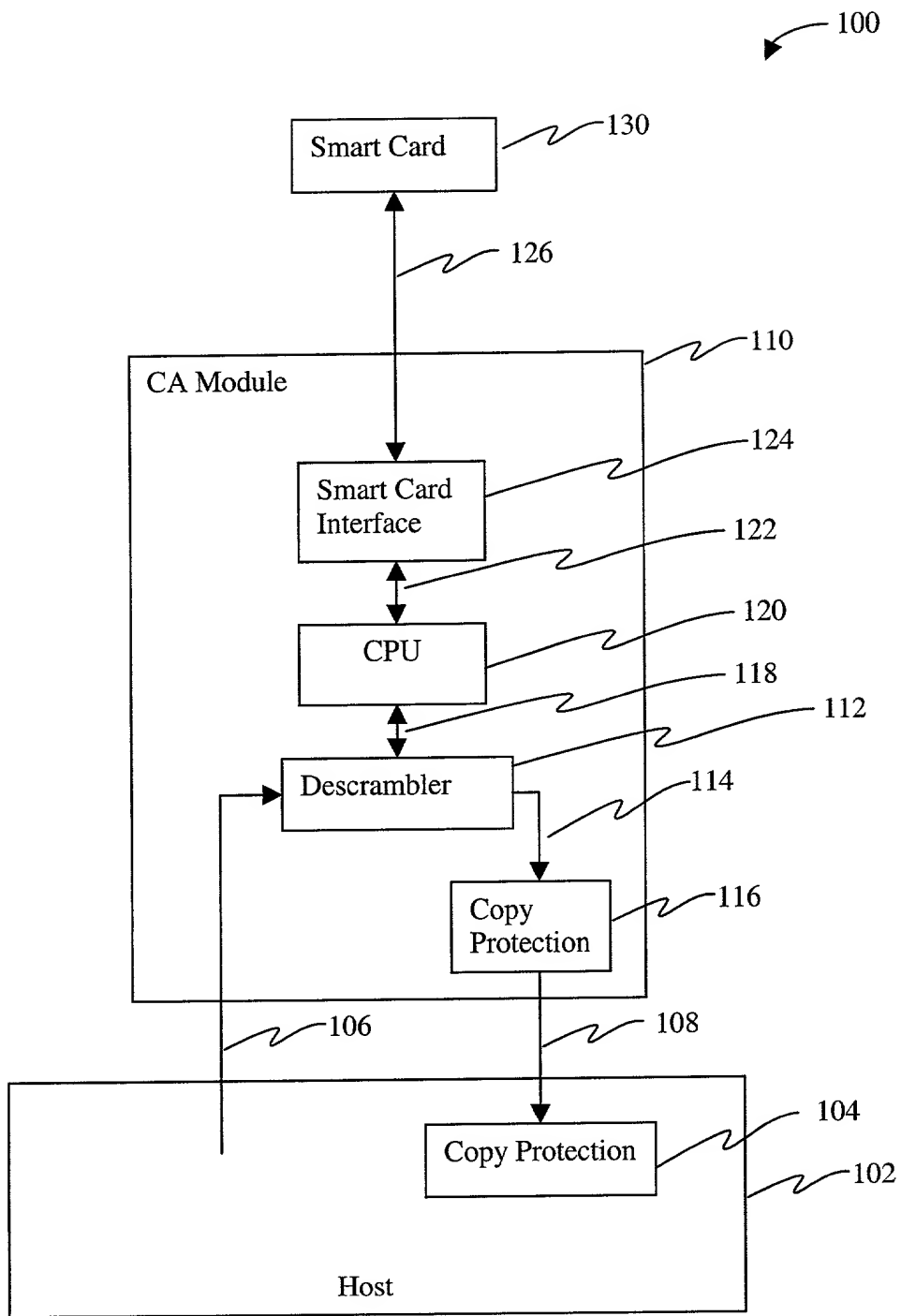


Figure 1 (Prior Art)

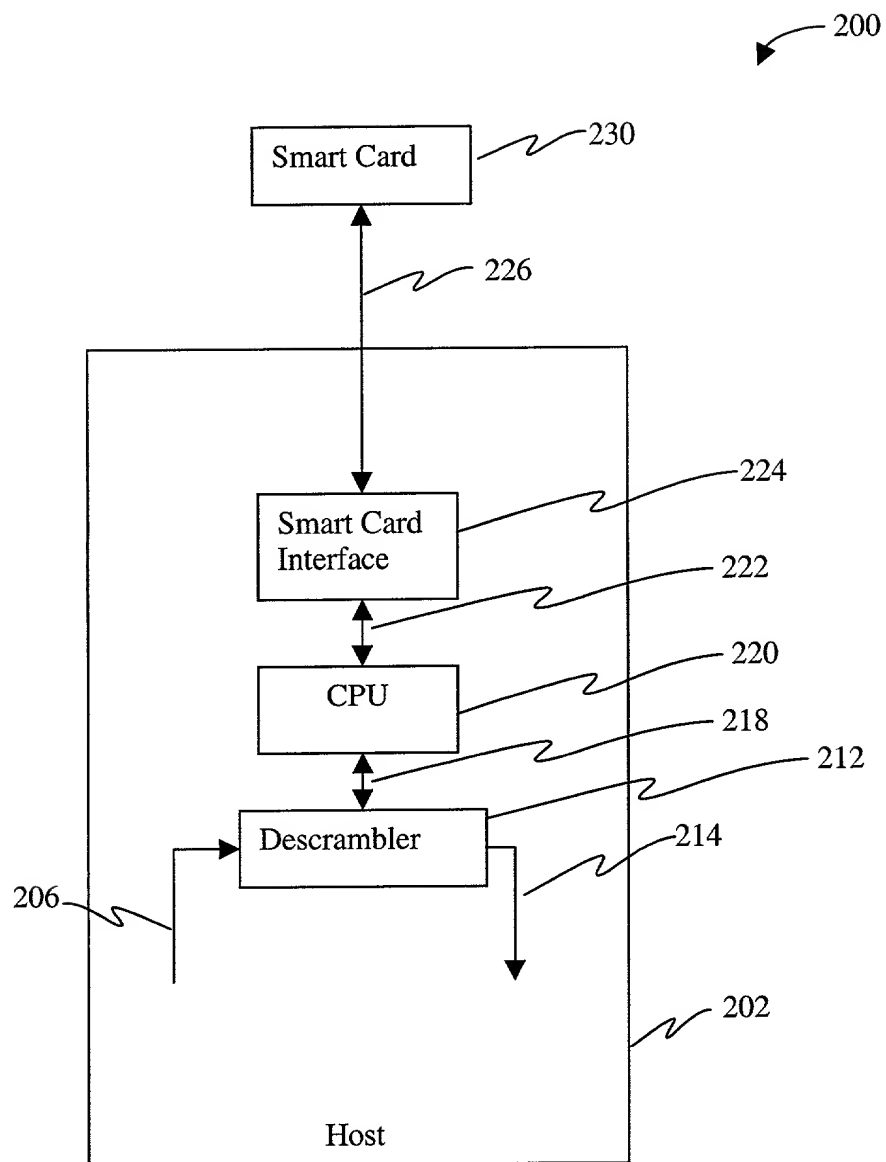


Figure 2

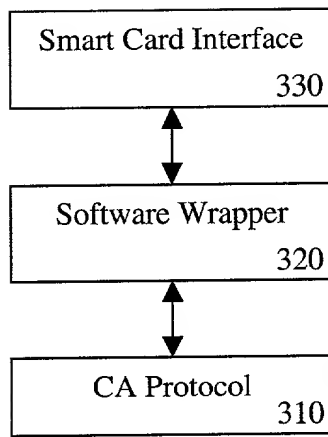


Figure 3

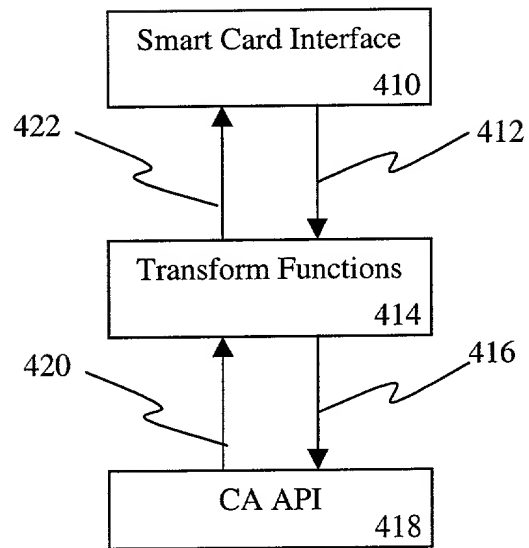


Figure 4

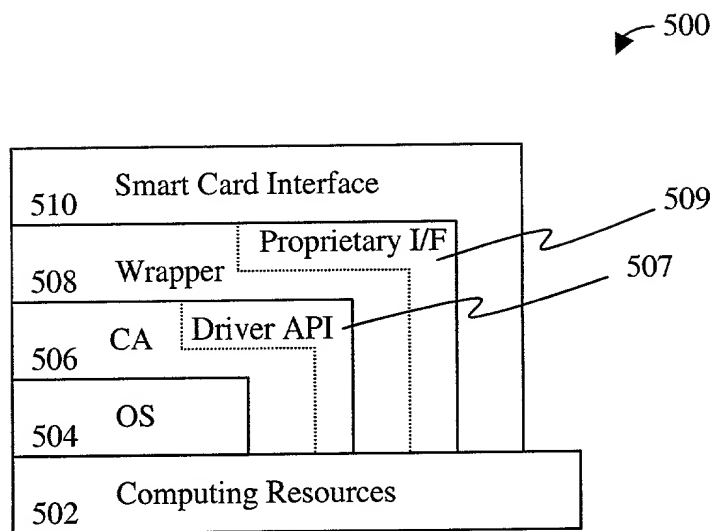


Figure 5

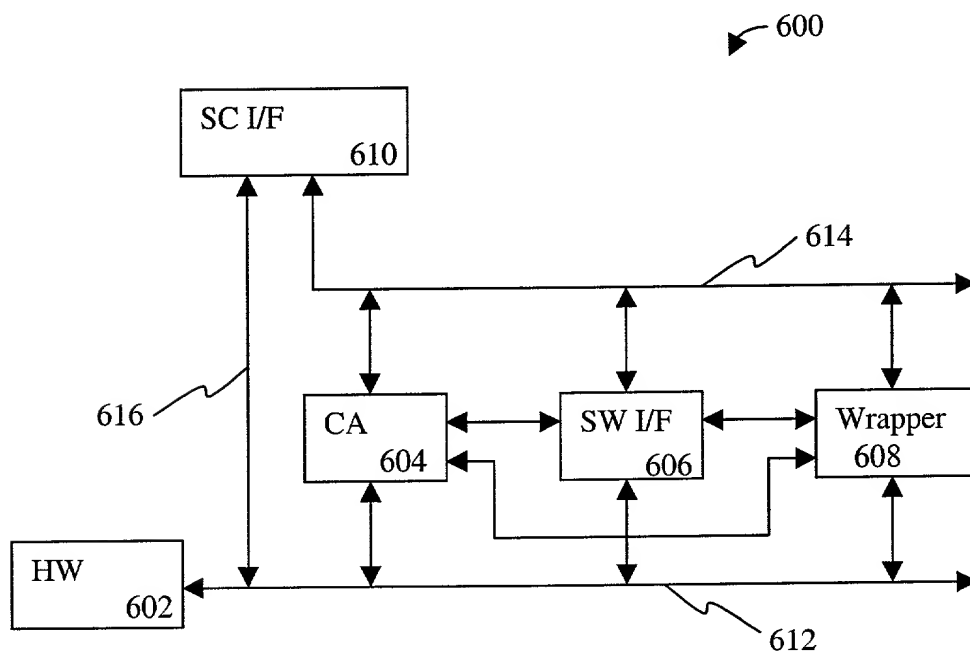


Figure 6

DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below, next to my name.

I believe I am the original, first, and sole inventor (if only one name is listed below) or an original, first, and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

METHOD FOR STANDARDIZING THE USE OF ISO 7816 SMART CARDS IN CONDITIONAL ACCESS SYSTEMS

the specification of which

X is attached hereto.
_____ was filed on (MM/DD/YYYY) _____ as
United States Application Number _____
or PCT International Application Number _____
and was amended on (MM/DD/YYYY) _____.
(if applicable)

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claim(s), as amended by any amendment referred to above. I do not know and do not believe that the claimed invention was ever known or used in the United States of America before my invention thereof, or patented or described in any printed publication in any country before my invention thereof or more than one year prior to this application, that the same was not in public use or on sale in the United States of America more than one year prior to this application, and that the invention has not been patented or made the subject of an inventor's certificate issued before the date of this application in any country foreign to the United States of America on an application filed by me or my legal representatives or assigns more than twelve months (for a utility patent application) or six months (for a design patent application) prior to this application.

I acknowledge the duty to disclose all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119(a)-(d), of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)

Priority
Claimed

<u>(Number)</u>	<u>(Country)</u>	<u>(Foreign Filing Date - MM/DD/YYYY)</u>	<u>Yes</u>	<u>No</u>
<u>(Number)</u>	<u>(Country)</u>	<u>(Foreign Filing Date - MM/DD/YYYY)</u>	<u>Yes</u>	<u>No</u>
<u>(Number)</u>	<u>(Country)</u>	<u>(Foreign Filing Date - MM/DD/YYYY)</u>	<u>Yes</u>	<u>No</u>

I hereby claim the benefit under title 35, United States Code, Section 119(e) of any United States provisional application(s) listed below:

<u>(Application Number)</u>	<u>(Filing Date – MM/DD/YYYY)</u>
<u>(Application Number)</u>	<u>(Filing Date – MM/DD/YYYY)</u>

I hereby claim the benefit under Title 35, United States Code, Section 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, Section 112, I acknowledge the duty to disclose all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application:

<u>(Application Number)</u>	<u>(Filing Date – MM/DD/YYYY)</u>	<u>(Status -- patented, pending, abandoned)</u>
<u>(Application Number)</u>	<u>(Filing Date – MM/DD/YYYY)</u>	<u>(Status -- patented, pending, abandoned)</u>

I hereby appoint the persons listed on Appendix A hereto (which is incorporated by reference and a part of this document) as my respective patent attorneys and patent agents, with full power of substitution and revocation, to prosecute this application and to transact all business in the Patent and Trademark Office connected herewith.

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(Name of Attorney or Agent)
ZAFMAN LLP, 12400 Wilshire Boulevard 7th Floor, Los Angeles, California 90025 and direct
telephone calls to Maria McCormack Sobrino, (408) 720-8300.
(Name of Attorney or Agent)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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Post Office Address _____

Full Name of Fourth/Joint Inventor _____

Inventor's Signature _____ Date _____

Residence _____ Citizenship _____
(City, State) (Country)

Post Office Address _____

APPENDIX A

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APPENDIX B

Title 37, Code of Federal Regulations, Section 1.56 Duty to Disclose Information Material to Patentability

(a) A patent by its very nature is affected with a public interest. The public interest is best served, and the most effective patent examination occurs when, at the time an application is being examined, the Office is aware of and evaluates the teachings of all information material to patentability. Each individual associated with the filing and prosecution of a patent application has a duty of candor and good faith in dealing with the Office, which includes a duty to disclose to the Office all information known to that individual to be material to patentability as defined in this section. The duty to disclosure information exists with respect to each pending claim until the claim is cancelled or withdrawn from consideration, or the application becomes abandoned. Information material to the patentability of a claim that is cancelled or withdrawn from consideration need not be submitted if the information is not material to the patentability of any claim remaining under consideration in the application. There is no duty to submit information which is not material to the patentability of any existing claim. The duty to disclose all information known to be material to patentability is deemed to be satisfied if all information known to be material to patentability of any claim issued in a patent was cited by the Office or submitted to the Office in the manner prescribed by §§1.97(b)-(d) and 1.98. However, no patent will be granted on an application in connection with which fraud on the Office was practiced or attempted or the duty of disclosure was violated through bad faith or intentional misconduct. The Office encourages applicants to carefully examine:

- (1) Prior art cited in search reports of a foreign patent office in a counterpart application, and
 - (2) The closest information over which individuals associated with the filing or prosecution of a patent application believe any pending claim patentably defines, to make sure that any material information contained therein is disclosed to the Office.
- (b) Under this section, information is material to patentability when it is not cumulative to information already of record or being made or record in the application, and
- (1) It establishes, by itself or in combination with other information, a prima facie case of unpatentability of a claim; or
 - (2) It refutes, or is inconsistent with, a position the applicant takes in:
 - (i) Opposing an argument of unpatentability relied on by the Office, or
 - (ii) Asserting an argument of patentability.

A prima facie case of unpatentability is established when the information compels a conclusion that a claim is unpatentable under the preponderance of evidence, burden-of-proof standard, giving each term in the claim its broadest reasonable construction consistent with the specification, and before any consideration is given to evidence which may be submitted in an attempt to establish a contrary conclusion of patentability.

(c) Individuals associated with the filing or prosecution of a patent application within the meaning of this section are:

- (1) Each inventor named in the application;
 - (2) Each attorney or agent who prepares or prosecutes the application; and
 - (3) Every other person who is substantively involved in the preparation or prosecution of the application and who is associated with the inventor, with the assignee or with anyone to whom there is an obligation to assign the application.
- (d) Individuals other than the attorney, agent or inventor may comply with this section by disclosing information to the attorney, agent, or inventor.